

Listing of Claims

This listing of claims is provided for the convenience of the examiner. No changes have been made to the listing from the previous response.

1. (previously presented) A computerized method for creating a three dimensional model from image panoramas, the method comprising: receiving at a computer a plurality of image panoramas representing a visual scene and having an object, the object occupying a field of view of more than 180 degrees in the panoramas; using the computer, determining a directional vector for each image panorama, the directional vector indicating an orientation of the visual scene with respect to a reference coordinate system; transforming the image panoramas such that the directional vectors are substantially aligned relative to the reference coordinate system; aligning the transformed image panoramas to each other; and, using the computer, creating a three dimensional model of the visual scene from the transformed and aligned image panoramas using the reference coordinate system, wherein creating a three dimensional model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the object boundary in the reference coordinate system.

2. (previously presented) The method of claim 1 wherein the directional vector

is determined based, at least in part, on instructions identifying elements of the image panoramas received from a user.

3. (previously presented) The method of claim 2 wherein the instructions from the user identify two or more substantially parallel features in the image panoramas.

4. Cancelled.

5. (previously presented) The method of claim 2 wherein the instructions from the user identify a horizon line of at least one image panorama.

6. (previously presented) The method of claim 2 wherein the instructions comprise the identification of two or more areas of the image panoramas, each area containing one or more elements and further comprising automatically identifying the two elements contained in the two or more areas.

7. (original) The method of claim 6 further comprising using edge detection to automatically identify the two elements.

8. (previously presented) The method of claim 1 wherein the image panoramas are aligned relative to the reference coordinate system such that the directional vector of each panorama is at least substantially parallel to one axis of the

reference coordinate system.

9. (previously presented) The method of claim 1 wherein the image panoramas are aligned relative to the reference coordinate system such that the directional vector of each panorama is at least substantially orthogonal to one axis of the reference coordinate system.

10. (original) The method of claim 1 wherein the image panoramas are aligned according to instructions received from a user.

11. (previously presented) A computerized method of interactively editing objects in a panoramic image, the method comprising: receiving an image panorama representing a visual scene, the image panorama having an object and a point source, the object occupying a field of view of more than 180 degrees in the panorama; using the computer creating a three dimensional model of the visual scene using features of the visual scene and the point source, wherein creating a three dimensional model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the object boundary in a reference coordinate system; using the computer receiving an edit to the object in the panorama; using the computer transforming the edit relative to a viewpoint defined by the point source; and projecting the transformed edit onto

the object.

12. Cancelled.

13. (previously presented) The method of claim 11, further comprising receiving an edit to color information associated with the object.

14. (previously presented) The method of claim 11, further comprising receiving an edit to alpha information associated with the object.

15. (previously presented) The method of claim 11, further comprising receiving an edit to depth information associated with the object.

16. (previously presented) The method of claim 11, further comprising receiving an edit to geometry information associated with the object.

17. (previously presented) The method of claim 11 further comprising:
providing a user with an interactive drawing tool that specifies edits for the object; and receiving the edits made by the user using the interactive drawing tool.

18. (previously presented) The method of claim 17 wherein the interactive drawing tool is one of an extrusion tool, a ground plane tool, a depth chisel tool.

and a non-uniform rational B-spline tool.

19. (previously presented) The method of claim 17, wherein the interactive drawing tool specifies a selected value for depth for the object.

20. (previously presented) The method of claim 17, wherein the interactive drawing tool incrementally adds to the depth for the object.

21. (previously presented) The method of claim 17, wherein the interactive drawing tool incrementally subtracts from the depth for the object.

22. (previously presented) A computerized method for projecting texture information onto an object within an image panorama, the method comprising: using the computer receiving instructions from a user identifying a three-dimensional geometric surface within an image panorama, the image panorama containing an object having one or more textures, the object occupying a field of view of more than 180 degrees in the panorama; determining a directional vector from the three-dimensional geometric surface; using the computer creating a geometric model of the image panorama based at least in part on the three-dimensional geometric surface and the directional vector, wherein creating a geometric model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the object, the geometry information comprising 3-D

coordinates describing the position and orientation of the object boundary in a reference coordinate system; and applying the one or more textures to the object in the image panorama based on the geometric model.

23. (original) The method of claim 22 wherein the instructions are received using an interactive drawing tool.

24. (original) The method of claim 22 wherein the three-dimensional geometric surface is one of a floor, a wall, or a ceiling.

25. (original) The method of claim 22 wherein the directional vector is orthogonal to the planar surface.

26. (original) The method of claim 22 wherein the geometric model comprises depth information.

27. (original) The method of claim 22 wherein the texture information comprises color information.

28. (original) The method of claim 22 wherein the texture information comprises luminance information.

29-31 Cancelled.

32. (previously presented) A system for creating a three dimensional model from a plurality of image panoramas, the system comprising: means for receiving the image panoramas representing a visual scene having an object; the object occupying a field of view of more than 180 degrees in the panoramas, means for allowing a user to interact with the system to determine a directional vector for each image panorama; means for aligning the image panoramas relative to each other; and means for creating a three dimensional model from the aligned panoramas, wherein creating a three dimensional model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the object the geometry information comprising 3-D coordinates describing the position and orientation of the object boundary in a reference coordinate system.

33. (previously presented) The system of claim 32, wherein the input image panoramas comprise two-dimensional images.

34. (previously presented) The system of claim 32, wherein the input image panoramas comprise three-dimensional images including geometry information.

35. (original) The system of claim 32 wherein the image panoramas are aligned according to instructions received from a user.

36. (previously presented) A system for interactively editing objects in a panoramic image, the system comprising: a receiver for receiving one or more image panoramas representing a visual scene having one or more objects and a point source; a modeling module for creating a three dimensional model of the visual scene including identifying a selected object in the one or more image panoramas, the selected object occupying a field of view of more than 180 degrees in the panoramas, and wherein creating a three dimensional model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the boundary of the selected object, the geometry information comprising 3-D coordinates describing the position and orientation of the selected object in a reference coordinate system; one or more interactive editing tools for providing an edit to the selected object; a transformation module for transforming the edit relative to a viewpoint defined by the point source; and a rendering module for projecting the transformed edit onto the selected object.

37. (previously presented) The system of claim 36 wherein the one or more editing tools comprises at least one of a ground plane tool, an extrusion tool, a depth chisel tool, and a non-uniform rational B-spline tool.

38. (previously presented) A computerized method for creating a three dimensional model from an image panorama, the method comprising: receiving

an image panorama representing a visual scene and having an object, the object occupying a field of view of more than 180 degrees in the panorama; and creating a three dimensional model of the visual scene using a computer from the image panorama using the reference coordinate system, wherein creating a three dimensional model includes identifying at least one boundary of the object and using the identified boundary to associate geometry information with the object, the geometry information comprising 3-D coordinates describing the position and orientation of the object boundary in the reference coordinate system.

39. (previously presented) A method according to claim 1, wherein the object is a room and the at least one boundary of the object is the intersection of a wall of the room with the floor.

40. (previously presented) A method according to claim 22, wherein the object is a room and the at least one boundary of the object is the intersection of a wall of the room with the floor.

41. (previously presented) A method according to claim 38, wherein the object is a room and the at least one boundary of the object is the intersection of a wall of the room with the floor.